Multiplied optical delay based on Few mode fiber and Few-mode fiber Bragg gratings

Kok-Sing Lim, Muhammad Khairol Annuar Zaini, Yen-Sian Lee and Harith Ahmad

Photonics Research Centre, University of Malaya, Kuala Lumpur 50603, Malaysia

Corresponding (e-mail:kslim@um.edu.my)

Abstract

Optical delay line is one of the approaches in solving the contention in optical communication network. Basically, the optical data stream is launched into a long optical fiber to achieve a time delay until it is ready to be accepted for processing. The time delay is linearly proportional to the length of the optical fiber. In this work, we proposed an optical delay system based on a segment of few-mode fiber and two few-mode fiber Bragg gratings (FMFBG) which serve as selective mode convertors. The data stream is first launched into the LP_{01} mode in the FMF. Then the beam is reflected between the two FMFBGs and the signal is changing between LP_{01} and LP_{11} modes. The data stream exits the optical delay system in the form of LP_{01} mode after traveling back and forth in the FMF for two times. The accumulated propagation length is approximately 4 times the length of the FMF. Such system is useful for optical buffering in the optical communication system.